

Panasonic

Rechargeable Sealed Lead-Acid

Rechargeable Nickel Cadmium

Carbon Lithium Rechargeable Coin Type

Primary Lithium

Mercury

Cylindrical Alkaline

Mercury Switch

Carbon Zinc

Alkaline Button

PANASONIC RECHARGEABLE Ni-Cd BATTERIES OFFER SUPERIOR PERFORMANCE, HIGH POWER AND RELIABILITY.

Panasonic rechargeable nickel-cadmium batteries feature the superior performance, high power and reliability needed for today's high-technology equipment, ranging from AV and communications equipment to motorized devices and a variety of hobby equipment. In particular, the SM60 and SM30 series boast superior high energy density, compact dimensions and fast recharge times. These advanced energy cells make an important contribution to the practicality of designing small, multi-function equipment. They are ideal for all sorts of portable devices, especially high tech applications such as cellular phones, camcorders, and notebook computers.

FEATURES

• Long Life

The cell can provide more than 500 charge/discharge cycles. This makes it extremely economical, and provides an expected life similar to that of the device in which it is used.

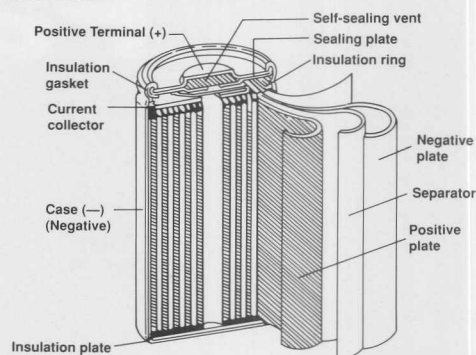
• Excellent Discharge Characteristics

Panasonic nickel cadmium batteries feature low internal resistance and high, flat voltage characteristics during high current discharge. Compared with conventional models, these products have a higher capacity and charge more rapidly. With the highest energy-density of any Ni-Cd battery in the world, they offer unsurpassed discharge characteristics suitable for a wide variety of applications.

• Long Shelf Life

The Panasonic Ni-Cd cell provides long storage life with few limiting conditions. It offers problem-free charging after long storage, permitting use in a wide range of applications.

CONSTRUCTION



• High-Rate Charging

For those applications which require it, the cells can be quick charged or rapid charged in 1 - 6 hours, using the appropriate charging circuits.

• Wide Temperature Range

Discharge characteristics are superior, even under low-temperature conditions. Cells for high temperature operation exhibit superb charging efficiency and long life, and in some applications can be used above 65°C.

• Reliable, Self-Releasing Vent

Each cell is equipped with a self-releasing safety vent which provides high reliability during long-term use or in the event of charger malfunction.

• Sealed, Strong, Leakproof Construction

Sealed construction, with no water addition required, provides safety and maintenance-free service. The cell can be used in any desired position during charge, discharge or storage conditions. Due to the special material used for the gasket, and the use of our original liquid sealing compound, there is no liquid leakage!

APPLICATIONS

				BATTERY TYPE					
				Standard	R	R/P	E	S	H
VISUAL EQUIPMENT				○	○			⊙	
	Audio/video instruments	Still cameras	Portable TVs						
AUDIO PRODUCTS				○	○			○	⊙
	Headphone stereos	Portable DATs	Portable CD players						
OFFICE EQUIPMENT				⊙	○	○		⊙	
	Laptop personal computers	Word processors	Handy copy machines						
COMMUNICATIONS EQUIPMENT				⊙	○			○	⊙
	Cellular mobilephones	Car telephone	Cordless telephones						
POWER TOOLS				○	○	⊙			
	Electric drills	Electric saws	Vacuum cleaners						
TOYS AND HOBBIES				○	○	⊙			
	Radio controlled cars	Radio controlled planes	Radio controlled submarine boats						
SECURITY SYSTEMS				○					⊙
	Lights, fire and burglar alarm systems	General security systems							
MEMORIES				○					⊙
	POS systems	Facsimiles							

RECHARGEABLE NICKEL CADMIUM BATTERIES

CELL SELECTOR GUIDE

(A) The data is based on the standard, "R", "P", and "E" types.

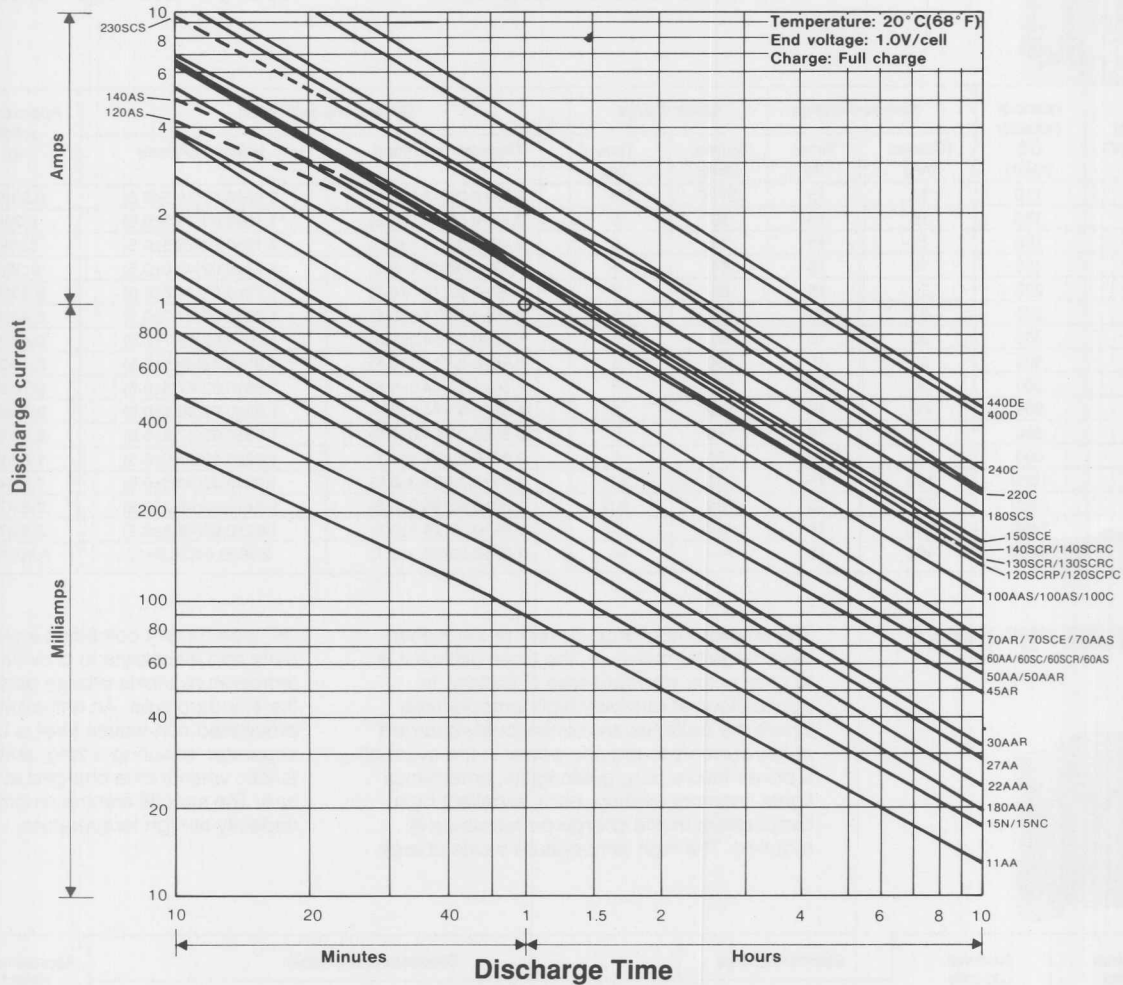
(B) Cell Selection:

- Determine desired run time and operating current.
- Use cell closest to the intersection of load and time on selector chart.

(C) Check that cells will fit into space available.

Example: Discharge time; 1 hour Discharge current; 1 Amp

From chart, 130SCR line is nearest to the circled point, so 130SCR is selected.



CHARGING SYSTEM

CYCLE (REPEATED) USE							STANDBY USE
Charging system		Standard charge	Quick charge		Rapid charge		Trickle charge system
		Non-control system	Non-control system	Timer control charging system	—ΔV cut off charging system	Temperature cut off charging system	
Operation outline							Semi-constant current charge at 1/20C 50 1/30CmA
BATTERY TYPE	Super high capacity & rapid charge "S" type	○		○	⊙		
	Standard type	⊙	○	○			
	Rapid charge "R" type	○	○	○	⊙	○	
	High rate discharge & rapid charge "R/P" type	○	○	○	⊙	○	
	High capacity "E" type	⊙					
	High temperature "H" type						⊙
	Memory backup "H" type						⊙
Features		Simple, inexpensive charge circuit	Simple, inexpensive charge circuit	Relatively simple inexpensive charge circuit	Ideal charge system that ensures full charge capability	Over charge at low temp. and under charge at high temp.	Simple inexpensive charge circuit

Key: ⊙ Best Selection ○ Alternate

STANDARD TYPE

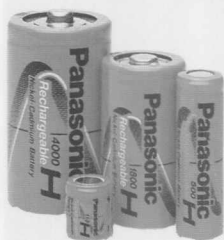


The standard battery is a combination of high-grade positive and negative plates developed by Panasonic's own plate manufacturing process. It ensures a high level of electrical capacity and uniform quality among products of the same size. In addition, it features minimized internal resistance and superb discharge performance, displaying stable

characteristics over a wide temperature range. Its sealed construction also improves safety and reliability. Furthermore, original special materials are employed for the insulation gasket, and liquid sealing guarantees reliable use on PC boards. The standard battery is available in a wide variety of models and sizes, meeting a broad range of applications.

Model No.	Nominal voltage (V)	Nominal capacity C/5 (mAh)	Standard charge		Quick charge		Dimensions (with tube)		Approximate weight (g)	Size
			(Current mA)	Time (h)	Current (mA)	Time (h)	Diameter inch(mm)	Height inch(mm)		
P-11AA	1.2	110	11	15	27.5	6	0.55±0.02(14.0±0.5)	0.65±0.02(16.5±0.5)	0.23(6.5)	1/3AA
P-15N	1.2	150	15	15	38	6	0.45±0.02(11.5±0.5)	1.16±0.02(29.5±0.5)	0.28(8)	N
P-15NC	1.2	150	15	15	38	6	0.45±0.02(11.5±0.5)	1.12±0.02(28.5±0.5)	0.28(8)	N
P-18AAA	1.2	180	18	15	54	5	0.39±0.02(10.0±0.5)	1.73±0.02(44.0±0.5)	0.35(10)	AAA
P-22AAA	1.2	220	22	15	66	5	0.39±0.02(10.0±0.5)	1.73±0.02(44.0±0.5)	0.35(10)	AAA
P-27AA	1.2	270	27	15	80	5	0.55±0.02(14.0±0.5)	1.09±0.02(27.7±0.5)	0.42(12)	2/3AA
P-30AA	1.2	300	30	15	90	5	0.55±0.02(14.0±0.5)	1.09±0.02(27.7±0.5)	0.42(12)	2/3AA
P-50AA	1.2	500	50	15	150	5	0.55±0.02(14.0±0.5)	1.95±0.02(49.5±0.5)	0.78(22)	AA
P-50AA/FT	1.2	500	50	15	150	5	0.55±0.02(14.0±0.5)	1.88±0.02(47.8±0.5)	0.78(22)	AA
P-60AA	1.2	600	60	15	180	5	0.55±0.02(14.0±0.5)	1.95±0.02(49.5±0.5)	0.78(22)	AA
P-60AA/FT	1.2	600	60	15	180	5	0.55±0.02(14.0±0.5)	1.88±0.02(47.8±0.5)	0.78(22)	AA
P-60SC	1.2	600	60	15	150	6	0.89±0.02(22.5±0.5)	1.02±0.02(26.0±0.5)	1.02(29)	2/3SC
P-100C	1.2	1000	100	15	333	4.5	1.00±0.02(25.3±0.5)	1.20±0.02(30.5±0.5)	1.59(45)	2/3C
P-220C	1.2	2200	220	15	730	4.5	1.00±0.02(25.3±0.5)	1.94±0.02(49.3±0.5)	2.65(75)	C
P-240C	1.2	2400	240	15	1500	2.4	1.00±0.02(25.3±0.5)	1.92±0.03(48.8±0.7)	2.55(73)	C
P-400D	1.2	4000	400	15	—	—	1.27±0.03(32.3±0.7)	2.36±0.04(59.9±1)	4.80(136)	D

HIGH TEMPERATURE "H" TYPE



The smaller the charge current or the higher the charge temperature, the more difficult it is to charge the standard type of battery. In applications at relatively high temperatures where the batteries are continuously charged at low currents to provide power in the event of a power failure (e.g. guide lights, emergency lights, memory backup, etc.), excellent high temperature trickle charge performance is required. The high temperature trickle charge

"H" type battery combines a unique negative plate and electrolyte to provide a better high temperature trickle charge performance than the standard type. An anti-alkaline, specially processed non-woven fiber is used for the separator, ensuring a long, stable life characteristic when trickle charged at high temperature. The special electrolyte provide improved capacity at high temperature.

Model No.	Nominal voltage (V)	Nominal capacity C/5 (mAh)	Standard charge		Dimensions(with tube)		Approximate weight oz.(g)	Size
			Current (mA)	Time (h)	Diameter inch(mm)	Height inch(mm)		
P-11AAH	1.2	110	3.7	48	0.55±0.02(14.0±0.5)	0.66±0.02(16.8±0.5)	0.23(6.5)	1/3AA
P-50AAH/FT	1.2	500	17	48	0.55±0.02(14.0±0.5)	1.88±0.02(47.8±0.5)	0.78(22)	AA
P-120SCH	1.2	1200	40	48	0.89±0.02(22.5±0.5)	1.67±0.02(42.5±0.5)	1.80(51)	SC
P-180CH	1.2	1800	60	48	1.00±0.02(25.3±0.5)	1.94±0.02(49.3±0.5)	2.65(75)	C
P-400DH	1.2	4000	133	48	1.27±0.03(32.3±0.7)	2.36±0.04(59.9±1.0)	4.90(139)	D

HIGH CAPACITY "E" TYPE



The high capacity "E" type battery has been developed to meet the need for a higher output or capacity than is possible with the standard type. The battery capacity is determined by the positive plate whose ratio to the negative plate is also a prime consideration.

Panasonic's unique technology has made it possible to produce a high capacity battery combining a high-density positive plate and a large capacity pasted negative plate. The result is a capacity 20% greater than that of a standard battery of the same size.

Model No.	Nominal voltage (V)	Nominal capacity C/5 (mAh)	Standard charge		Dimensions(with tube)		Approximate weight oz.(g)	Size
			Current (mA)	Time (h)	Diameter inch(mm)	Height inch(mm)		
P-70SCE	1.2	700	70	15	0.89±0.02(22.5±0.5)	1.02±0.02(26.0±0.5)	1.06(30)	2/3SC
P-150SCE	1.2	1500	150	15	0.89±0.02(22.5±0.5)	1.67±0.02(42.5±0.5)	1.80(51)	SC
P-440DE	1.2	4400	440	15	1.29±0.03(32.3±0.7)	2.36±0.04(59.9±1)	4.94(140)	D

RECHARGEABLE NICKEL CADMIUM BATTERIES

RAPID CHARGE "R" TYPE



Using Panasonic's total battery technology, the "R" type, a rapid charge type battery, uses advanced negative plates with enhanced gas absorption characteristics. It can be charged

at currents of 1 to 1.5CmA in as little as 1 to 1.5 hours with control for cut off at end of charge. They can withstand C/3 charge without control.

Model No.	Nominal voltage (V)	Nominal capacity C/5 (mAh)	Rapid charge		Dimensions		Approximate weight oz. (g)	Size
			Current (mA)	Time (h)	Diameter inch (mm)	Height inch (mm)		
P-30AAR	1.2	300	300	1.5	0.55±0.02(14.0±0.5)	1.09±0.02(27.7±0.5)	0.42(12)	2/3AA
P-45AR	1.2	450	450	1.5	0.65±0.02(16.5±0.5)	1.10±0.02(28.0±0.5)	0.63(18)	2/3A/
P-60AAR/FT	1.2	600	600	1.5	0.55±0.02(14.0±0.5)	1.88±0.02(47.8±0.5)	0.78(22)	AA
P-60SCR	1.2	600	600	1.5	0.89±0.02(22.5±0.5)	1.02±0.02(26.0±0.5)	0.95(27)	2/3 SC
P-70AR	1.2	700	700	1.5	0.65±0.02(16.5±0.5)	1.67±0.02(42.5±0.5)	0.95(27)	4/5A/
P-280CR	1.2	2800	2800	1.5	1.00±0.02(25.3±0.50)	1.92±0.02(48.8±0.7)	2.8(79)	C

HIGH RATE DISCHARGE AND RAPID CHARGE "R/P" TYPE



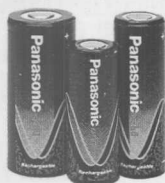
This rapid charge, high rate discharge type has been developed through the integration of all Panasonic battery technology. It employs unique plates featuring unsurpassed gas absorption characteristics and a current-collecting system to provide charging in just one to one and a half hours. The internal resistance is also greatly reduced for improved voltage characteristics during high rate discharge at approximately 10CmA.

The P-120SCR/P in particular is extremely pow

erful with improved high rate discharge characteristics, making possible a discharge of approximately 25CmA. The P-130SCR with capability of high rate discharge (approx. 10CmA) boasts a capacity approximately 10% larger than standard type batteries. Compact SC type (P-120SCPC/130SCRC) batteries are new. They have the same performance as the P-120 SCR/P, and P-130SCR but slightly lower height for critical dimension applications.

Model No.	Nominal voltage (V)	Nominal capacity C/5 (mAh)	Rapid charge		Maximum discharge current (A)	Dimensions (with tube)		Approximate weight oz. (g)	Size
			Current (mA)	Time (h)		Diameter inch (mm)	Height inch (mm)		
P-90SCR	1.2	1000	1000	1.5	10	0.89±0.02(22.5±0.5)	1.30±0.02(33.0±0.5)	1.23(35)	4/5SC
P-120SCR/P	1.2	1200	1200	1.5	30	0.89±0.02(22.5±0.5)	1.67±0.02(42.5±0.5)	1.66(47)	SC
P-130SCR	1.2	1300	1300	1.5	13	0.89±0.02(22.5±0.5)	1.67±0.02(42.5±0.5)	1.66(47)	SC
P-140SCR	1.2	1400	1400	1.5	14	0.89±0.02(22.5±0.5)	1.67±0.02(42.5±0.5)	1.66(47)	SC
Compact Type									
P-120SCPC	1.2	1200	1200	1.5	30	0.89±0.02(22.5±0.5)	1.634±0.02(41.5±0.5)	1.66(47)	SC
P-130SCRC	1.2	1300	1300	1.5	13	0.89±0.02(22.5±0.5)	1.634±0.02(41.5±0.5)	1.66(47)	SC
P-140SCRC	1.2	1400	1400	1.5	14	0.89±0.02(22.5±0.5)	1.634±0.02(41.5±0.5)	1.66(47)	SC

SUPER HIGH CAPACITY AND RAPID CHARGE "S" TYPE



Super high capacity and rapid charge "S" type batteries are ideal for today's high capacity needs. They feature increased capacity and rapid charging within approximately one hour. The high-density positive base material of

foam nickel is combined with the pasted negative plate to produce a capacity approximately 40-70% greater than that of the rapid-charge "R" type battery of the same size.

Model No.		Nominal voltage (V)	Nominal capacity (c/5) (mAh)	Standard charge		Dimensions (with tube)		Approximate weight oz. (g)	Size
				Current (mA)	Time (h)	Diameter inch(mm)	Height inch(mm)		
SM60	P-120AS	1.2	1200	1000	1.6	0.65±0.02(16.5±0.5)	1.67±0.02(42.5±0.5)	0.92(26)	4/5A/
	P-120AAS	1.2	1200	1200	1.5	0.55±0.02(14.0±0.5)	2.54±0.02(62.5±0.5)	1.02(29)	5/4AA
	P-140AS	1.2	1400	1400	1.5	0.65±0.02(16.5±0.5)	1.95±0.02(49.5±0.5)	1.16(32)	A/
	P-230SCS	1.2	2300	2000	1.6	0.88±0.02(22.5±0.5)	1.94±0.02(49.5±0.5)	2.24(57)	5/4SC
SM30	P-60AS	1.2	600	600	1.5	0.65±0.02(16.5±0.5)	1.10±0.02(28.0±0.5)	0.63(18)	2/3A/
	P-70AAS/FT	1.2	700	700	1.5	0.55±0.02(14.0±0.5)	1.88±0.22(47.8±0.5)	0.74(21)	AA
	P-100AS	1.2	1100	1100	1.5	0.65±0.02(16.5±0.5)	1.67±0.02(42.5±0.5)	0.88(25)	4/5A/
	P-100AAS	1.2	1000	1000	1.5	0.55±0.02(14.0±0.5)	2.54±0.02(64.5±0.5)	1.02(29)	5/4AA
	P-110AAS	1.2	1100	1100	1.5	0.55±0.02(14.0±0.5)	2.54±0.02(64.5±0.5)	1.02(29)	5/4AA
	P-180SCS	1.2	1800	1500	1.6	0.88±0.02(22.5±0.5)	1.67±0.02(42.5±0.5)	1.66(47)	SC

GENERAL DESCRIPTION

The LCR Series is a sealed lead-acid rechargeable battery system. The lead-calcium rechargeable (LCR) battery will stand up to tough operating conditions such as overcharge and deep discharge. In field service, troubles due to abnormal, improper operation or misuse are reduced to a minimum.

APPLICATIONS

CONSUMER APPLICATIONS

Portable VTR/VCR, TV, record players, tape recorders, vacuum cleaners and appliances, and as portable power supply.

COMMUNICATION AND TELEPHONE EQUIPMENT

Cordless portable telephones, and transceivers.

OFFICE EQUIPMENT

Portable calculators, computers, electronic cash registers, printers, and typewriters.

MEMORY BACKUP AND UPS

UPS systems, electronic cash registers, computers, sequencers.

TOOLS AND ENGINE-START

Grass and hedge trimmers, cordless drills, screwdrivers, engine-start, and electric saws.

INSTRUMENT AND MEDICAL EQUIPMENT

Electronic instruments, measuring equipment, medical electronics, and heart defibrillators.

PHOTOGRAPHY

Electronic camera strobe, VTR and movie lights.

TOYS AND HOBBY

Radio-controllers, motor driving, lights.

EMERGENCY DEVICES

Lights, fire and burglar alarms, communication systems, fire shutters.

FEATURES

HIGH QUALITY & HIGH RELIABILITY

The LCR battery has stable and reliable capacity. It can be easily maintained to permit proper operation of the equipment that it powers. The battery withstands overcharge, overdischarge, vibration, and shock, more readily than competitive products, and is capable of extended storage. To assure this high quality and reliability, LCR batteries are 100% tested on line for voltage, capacity, and seals. And all vents are 100% visually inspected during the final assembly process.

EXCEPTIONAL DEEP DISCHARGE RECOVERY

LCR batteries have exceptional deep discharge recovery and charge acceptance, even after deep or prolonged discharge, as illustrated in Figure 1.

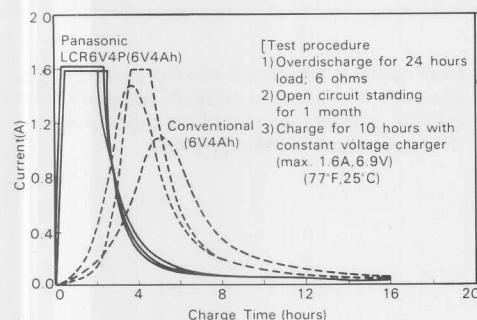


Fig. 1
Rechargeability after a Long Time
Standing in Overdischarged State.

QUICK CHARGEABILITY

Where rapid recharge is required for portable devices such as tools, computers or medical equipment, high charge rate batteries (designated LCS) are available. Coupled with proper charger, recharge in 1-1.5 hours is readily achieved.

NO CORROSIVE GAS GENERATION

There is no corrosive gas generation during normal use.

HIGH POWER DENSITY

Through accumulated experience in high technology products such as VTRs, computers, and electronic equipment, Panasonic has acquired the knowledge needed for developing and manufacturing batteries with high power density.

These batteries save installation space, while providing full and reliable power for the equipment, and many have been designed for rapid recharge, or for high power output.

As a result, this power is used for applications ranging from VTR's to vacuums, electric tools, engine-start, UPS systems and computers.

MAINTENANCE-FREE OPERATION

There is no need to check the specific gravity of the electrolyte or to add water during the service life. The LCR battery is totally sealed, and needs only charging for maintenance.

LEAKPROOF DESIGN

The LCR battery uses an absorbed electrolyte system. All of the electrolyte is absorbed into the positive plates, negative plates, and the separator material. Coupled with the use of special sealing epoxies, tongue and groove case and cover construction, and long-sealing paths for posts and connectors, the LCFR batteries have exceptional leak resistance, and can be used in any position. (The LCL and LCR batteries can be discharged in any position, but should not be charged while upside down.)

LONG SERVICE LIFE; FLOAT OR CYCLIC

APPROVED AS "DRY CELL" FOR AIR SHIPMENT BY DEPARTMENT OF TRANSPORTATION AND ICAO

UL AND VDS APPROVAL

U.L. Component Recognition under U.L.924, Section 38, for Emergency Lights and Power Supplier

File.MH13723, LCR6V3.2P, LCR6V4P, LCR6V1.3P, LCR6V2.4P, LCR6V3.4P, LCR12V2.2P, LCR6V6.5P, LCR6V8P, LCR6V10P, LCR12V6.5P, LCR12V17P, LCR12V24P, LCR12V1.3P, LCR12V3.4P, LCR6V6.5BP, LCR6V7.2P, LCR6V10BP, LCR12V6.5BP, LCR12V7.2P, LCL12V20P, LCL12V24P, LCL12V38P, LCL12V33P, LCL12V65P, LCS386, LCS414P, LCS2012APC, LCS218P, LCS384P, LCS416P, LCS2312P, LCS2912PL, LCS214, LCS318, LCT712P, LCT7120, LCT1912AP
Vds G184030, G186070, G185045, G1860438, G185046, G187041, G187040

CHARGING METHOD AND BATTERY APPLICATION

Constant Voltage	Cyclic operation	Trickle operation	Float operation
(Note: all at 68°F, 20°C)	Regulation range of controlled voltage: 6 volt batteries: 7.3V to 7.5V 12 volt batteries: 14.6V to 15.0V Initial current: 0.4C or less	Regulation range of controlled voltage: 6 volt batteries: 6.8V to 6.9V 12 volt batteries: 13.6V to 13.8V Initial current: 0.4C or less	Regulation range of controlled voltage: 6 volt batteries: 6.8V to 6.9V 12 volt batteries: 13.6V to 13.8V Initial current: 0.4C or less

RECHARGEABLE SEALED LEAD-ACID BATTERIES

CYCLE LIFE

Cycle life is very much dependent on the depth of the discharge which the battery encounters during each cycle.

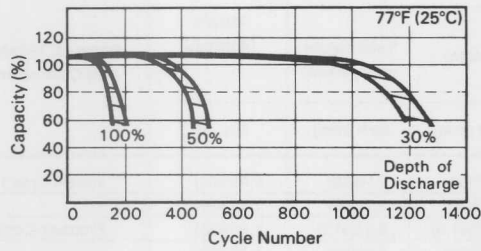


Fig. 2
Cycle Life vs Depth of Discharge

"SHELF LIFE"

Self-discharge rate is very much dependent on the storage temperature as shown in Fig 3. Lower temperatures allow the battery to be stored for longer periods. (Each ten degree drop results in halving of shelf-discharge rate and doubles storage time.)

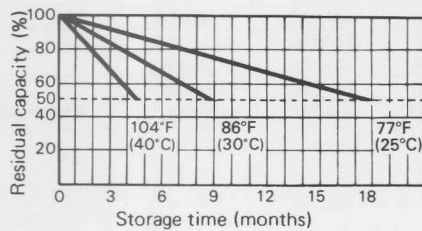


Fig. 3
Capacity vs Storage Time

"SHELF LIFE"—STORAGE TIME VS. TEMPERATURE

Fig 4 shows the time for the capacity to decrease to 50% of nominal capacity at each temperature during storage. If the storage temperature is known, the graph may be used for finding the most useful recharge intervals.

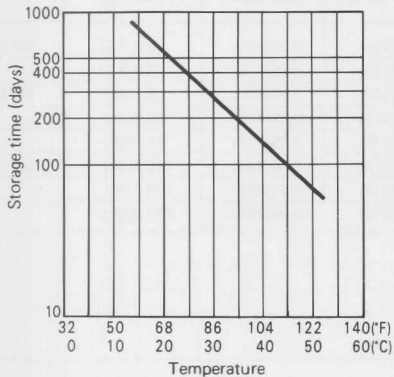


Fig. 4
Storage Time vs Temperature

CHARGING-TEMPERATURE COMPENSATION

It is recommended that the charge voltage be adjusted to compensate for the battery temperature as shown below. If desired, this may be done by detecting the ambient temperature near the battery instead of the battery temperature.

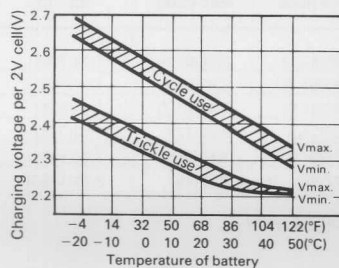


Fig. 5
Charging Temperature-Voltage Compensation

FLOAT OR BACK UP LIFE

The expected float life at room temperature is approximately 8 years on the basis of accelerated tests as shown in Fig 6

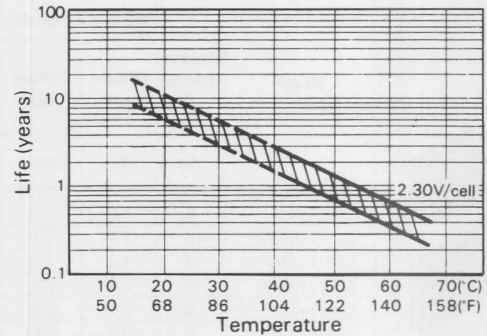


Fig. 6
Effect of Temperature on Long Term Float Life

EFFECT OF TEMPERATURE UPON PERFORMANCE

The available capacity is affected by both temperature and discharge current as shown in Fig 7

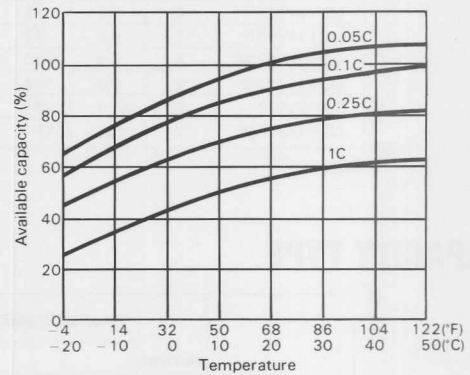


Fig. 7
Effect of Temperature and Discharge Rate on Available Capacity

OPEN CIRCUIT VOLTAGE & RESIDUAL CAPACITY

Residual capacity can be estimated by measuring the open circuit voltage as shown in Fig 8

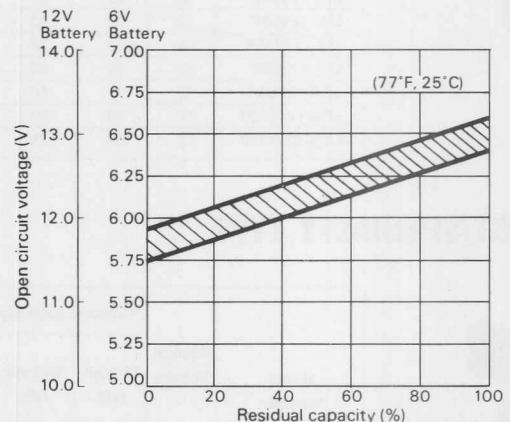


Fig. 8
Open Circuit Voltage vs Residual Capacity

TEMPERATURE RANGE SUMMARY

Discharge:	5°~122°F	-15°~50°C
Charge:	32°~104°F	0°~40°C
Storage:	5°~104°F	-15°~40°C

GENERAL TYPE



Model Number	Nominal Voltage	*Nominal Capacity		Dimensions				Weight (Approx.)	Standard Terminals or Connectors
		10 hour rate	20 hour rate	Length	Width	Height	Total Height (including terminals)		
	(V)	(Ah)	(Ah)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	lbs. (g)	
LCR 6V1.3P	6	1.2	1.3	3.82(97)	0.94(24)	1.97(50)	2.16(56)	0.66(300)	Faston Type 187
LCR 12V1.3P	12	1.2	1.3	3.82(97)	1.87(47.5)	1.97(50)	2.16(56)	1.30(590)	"
LCT-1912AP	12	1.8	1.9	0.94(23.8)	7.17(182)	2.33(61.5)	2.43(61.7)	1.40(635)	Pressure Contact
LCR 12V2.2P	12	2.0	2.2	6.97(177)	1.34(34)	2.36(60)	2.60(66)	1.76(800)	"
LCR 6V2.4P	6	2.2	2.4	2.60(66)	1.30(33)	3.88(98.5)	4.11(104.5)	1.15(520)	Faston Type 187
LCR 6V3.4P	6	3.0	3.4	5.28(134)	1.34(34)	2.36(60)	2.60(66)	1.36(620)	"
LCR 12V3.4P	12	3.0	3.4	5.28(134)	2.64(67)	2.36(60)	2.60(66)	2.73(1240)	"
LCR 6V3.2P	6	3.0	3.2	2.60(66)	1.30(33)	4.69(119)	4.92(125)	1.46(660)	"
LCR 6V4P	6	3.7	4.0	2.76(70)	1.89(48)	4.02(102)	4.25(108)	1.83(830)	"
LCR 6V4PL	6	3.7	4.0	2.76(70)	1.89(48)	4.02(102)	4.02(102)	1.83(830)	Lead wire Type
LCR 12V4PF	12	3.7	4.0	2.76(70)	3.82(97)	4.02(102)	4.33(110)	3.66(1660)	Faston Type 187
LCR 6V6.5P/BP	6	5.8	6.5	5.95(151)	1.34(34)	3.70(94)	3.94(100)	2.54(1150)	Faston Type 187 or 250
LCR 12V6.5P/BP	12	5.8	6.5	5.95(151)	2.54(64.5)	3.70(94)	3.94(100)	4.85(2200)	"
* LCR 6V7.2P	6	6.8	7.2	5.95(151)	1.34(34)	3.70(94)	3.94(100)	2.76(1250)	"
* LCR 12V7.2P	12	6.8	7.2	5.95(151)	2.54(64.5)	3.70(94)	3.94(100)	5.29(2400)	"
LCR 6V10P/BP	6	9.3	10.0	5.95(151)	1.97(50)	3.70(94)	3.94(100)	3.86(1750)	"
LCR 12V10PF	12	9.3	10.0	5.95(151)	3.98(101)	3.70(94)	4.01(102)	7.72(3500)	"
* LCR 6V12P	6	11.3	12.0	5.95(151)	1.97(50)	3.70(94)	3.94(100)	4.19(1900)	"
LCR 12V17BP	12	15	17	7.13(181)	3.00(76)	6.58(167)	6.58(167)	14.3(6500)	M5 Bolt and Nut type

*New

LARGE CAPACITY TYPE



Model Number	Nominal Voltage	*Nominal Capacity		Dimensions				Weight (Approx.)	Standard Terminals or Connectors
		10 hour rate	20 hour rate	Length	Width	Height	Total Height (including terminals)		
	(V)	(Ah)	(Ah)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	lbs. (Kg)	
LCL 12V20P	12	18	20	7.28(185)	4.92(125)	6.50(165)	6.50(165)	16.5(7.5)	M5 Bolt and Nut type
LCL 12V24P	12	22	24	4.92(125)	6.50(165)	6.89(175)	6.89(175)	19.2(8.7)	"
LCL 12V33P	12	30	33	7.70(196.5)	5.12(130)	6.10(155)	7.09(180)	26.5(12)	M6 Bolt and Nut type
LCL 12V38P	12	35	38	7.76(197)	6.50(165)	6.89(175)	6.89(175)	28.7(13)	"
LCL 12V65P	12	57	65	13.8(350)	6.54(166)	6.85(174)	6.85(174)	41.9(19)	"
LCR 12V80P	12	70	80	16.03(407)	6.82(173)	8.27(210)	9.69(246)	80.0(36)	M8 Bolt and Nut type
LCR 12V100P	12	86	100	19.77(502)	7.09(180)	8.27(210)	10.04(255)	100.0(45)	"
LCR 12V120P	12	104	120	19.89(505)	8.67(220)	8.27(210)	10.04(255)	115.0(52)	"

COMPACT/SPECIALTY TYPE



Model Number	Nominal Voltage	*Nominal Capacity		Dimensions				Weight (Approx.)	Standard Terminals or Connectors
		10 hour rate	20 hour rate	Length	Width	Height	Total Height (including terminals)		
	(V)	(Ah)	(Ah)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	lbs. (g)	
LCR-1812VBNC	12	1.8	1.9	7.89(200.5)	0.98(24.8)	2.38(60.5)	2.38(60.5)	1.54(700)	DC Plug
LCS-2012VBNC	12	2.0	2.1	7.90(200.7)	0.98(24.8)	2.43(61.7)	2.43(61.7)	1.54(700)	Pressure contact
LCS-2312AVBNC	12	2.3	2.4	7.17(182)	0.94(23.85)	2.42(61.5)	2.43(61.7)	1.40(635)	"
LCS-2012BVBNC	12	2.0	2.2	1.14(29)	3.11(79)	6.02(153)	6.02(153)	1.58(715)	"
LCS-2012DVBNC	12	1.95	1.95	5.65(143.5)	0.94(23.85)	2.55(64.8)	2.56(65)	1.30(590)	"
LCR-3012VBNC	12	3.0	3.2	9.45(240)	1.34(34)	2.72(69)	2.72(69)	2.91(1320)	DC Plug

*The data shown above are mean values and should be obtained within 3 times of charge/discharge cycles

RECHARGEABLE SEALED LEAD-ACID BATTERIES

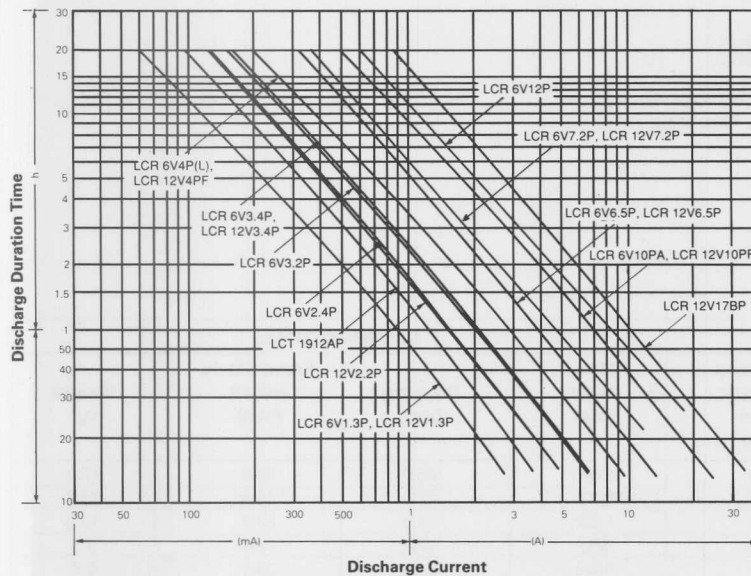
HIGH RATE TYPE



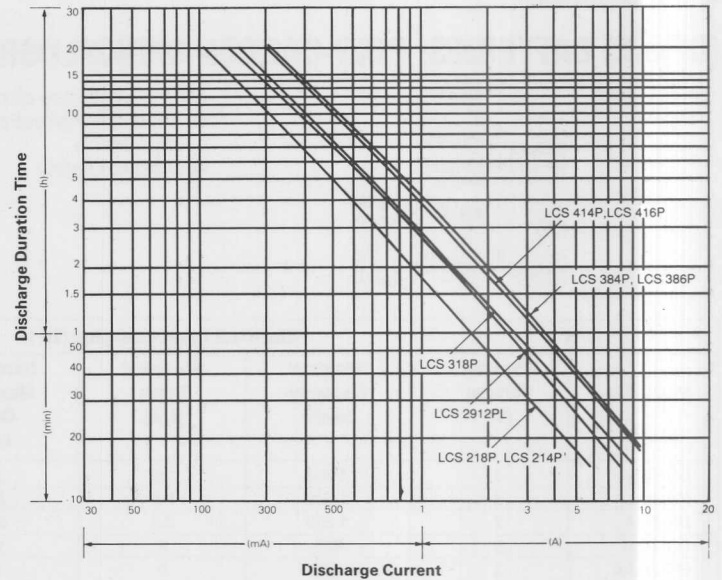
Model Number	Nominal Voltage	Nominal Capacity		Dimensions				Weight (Approx.)	Standard Terminals or Connectors
		10 hour rate	20 hour rate	Length	Width	Height	Total Height		
	(V)	(Ah)	(Ah)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	lbs. (g)	
LCS-214P	4	2.1	2.2	1.90(48.3)	1.41(35.8)	2.48(63.1)	2.52(63.9)	0.57(260)	Pressure Contact
LCS-218P	8	2.1	2.2	1.89(48.0)	2.65(67.3)	2.48(63.1)	2.50(63.4)	1.15(520)	"
LCS-318P	8	3.1	3.2	1.89(48.0)	2.65(67.3)	3.56(90.3)	3.57(90.6)	1.59(720)	"
LCS-384P	4	3.8	4.0	1.88(47.8)	1.40(35.5)	4.67(118.7)	4.69(119)	1.08(490)	"
LCS-386P	6	3.8	4.0	2.03(51.5)	1.88(47.7)	4.67(118.7)	4.69(119)	1.52(690)	"
LCS-414P	4	4.1	4.3	1.88(47.8)	1.40(35.5)	4.67(118.7)	4.69(119)	1.12(510)	"
LCS-416P	6	4.1	4.3	1.88(47.8)	2.03(51.5)	4.67(118.7)	4.69(119)	1.63(740)	"
LCS-2912PL	12	2.9	3.0	4.02(102)	2.19(55.5)	3.11(79)	3.14(79.8)	2.76(1250)	Leadwire Type

AMPERE-HOUR SELECTION CHARTS

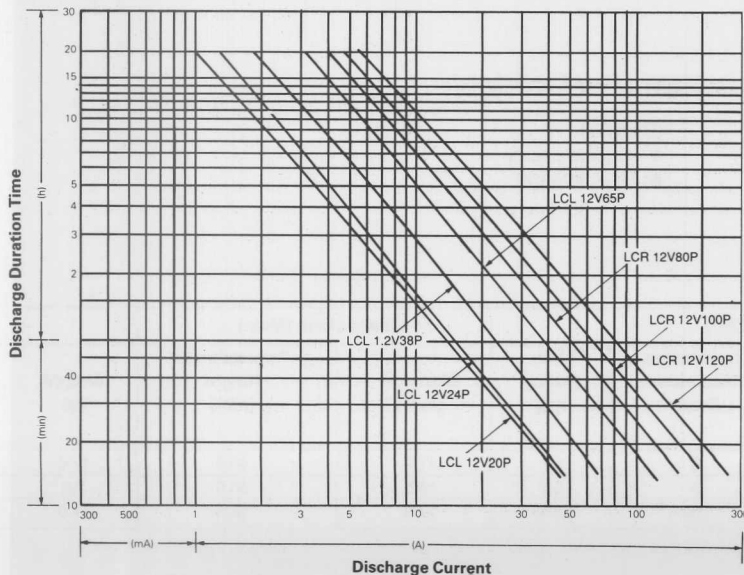
GENERAL TYPE



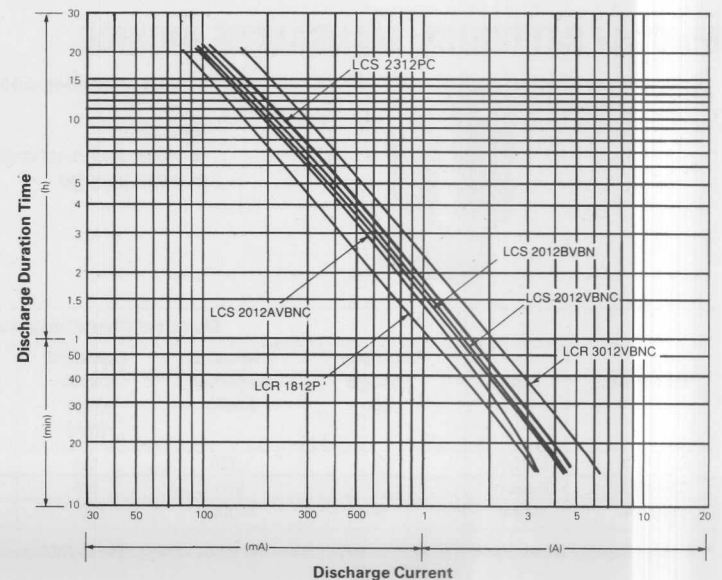
HIGH RATE TYPE



LARGE CAPACITY TYPE



CAPACITY/SPECIALITY TYPE



VERSATILE, LONG-LIFE LITHIUM BATTERIES GENERAL DESCRIPTION

Since 1971, Panasonic has pioneered the development of Lithium Batteries as an extremely long life, leakproof, high-energy power source for a wide range of electronic applications.

Panasonic has expanded the variety of sizes, and has continued to improve characteristics and quality to meet market needs. As a result of utilizing unique automated production and management technology, Panasonic has perfected

commercial production of lithium batteries. The superior characteristics of these batteries as well as their safety and excellent component reliability are acclaimed the world over.

CYLINDRICAL TYPE LITHIUM BATTERIES

FEATURES

The common features of (CF)n/Li and MnO₂/Li batteries are as follows:

- High voltage
- High energy density
- Long shelf life
- Stable operation
- High rate discharge
- Wide operating temperatures
- Strong leakage resistance
- Excellent durability

APPLICATIONS

- Cameras:
- Memory Back-up
- Electronic Water Meter
- Hot Water Meter
- Emergency Signal Light:
- Electrical Lock

- Gas Safety Emergency Cutoff System:
- Industrial Equipment
- Equipment for High Altitudes and Polar Regions
- Electronic Measurement Equipment
- Electronic Counter

(CF)n/Li BATTERIES: POLY-CARBON MONOFLUORIDE



(CF)n/Li batteries also offer the following:

- Flat discharge voltage and stable internal impedance
- Excellent safety

Model No.	Electrical Characteristics (20°)					Dimensions (Max.)		Weight (g)
	Nominal Voltage (V)	*Nominal Capacity (mah)	Standard Drain (ma)	Continuous Maximum Drain (ma)	Max. Pulse (ma)	Diameter (mm)	Approximate Height (mm)	
BR-C	3	5000	150	300	1,000	26.0	50.0	47.0
BR-A	3	1,800	2.5	250	1,000	17.0	45.5	18.0
BR-2/3A	3	1,200	2.5	250	1,000	17.0	33.5	13.5
BR-1/2A	3	650	2	120	500	17.0	23.0	9.5
BR-2/3AA	3	600	2	80	5000	14.5	33.5	9.5

* Nominal Capacity shown above is based on standard drain and cut off voltage down to 1.8V at 20°C

MnO₂/Li BATTERIES: MANGANESE DIOXIDE



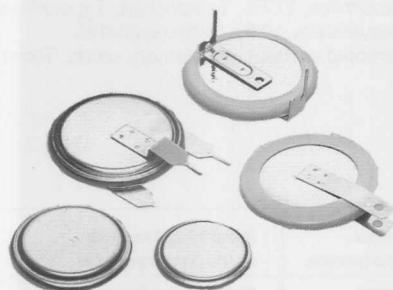
MnO₂/Li batteries add the following characteristics

- | | |
|-----------------------|-----------------|
| (Spiral) | (Bobbin) |
| ● High rate discharge | ● High capacity |
| ● High voltage | ● High voltage |

Model No.	Type	Electrical Characteristics (20°)					Dimensions (Max.)		Weight (g)
		Nominal Voltage (V)	**Nominal Capacity (mah)	Standard Drain (ma)	Continuous Maximum Drain	Max. Pulse (ma)	Diameter (mm)	Approximate Height (mm)	
CR17335	Bobbin	3	1,750	1.0	8	80	17.0	33.5	17.0
CR14250	Bobbin	3	850	0.5	5	60	14.5	25.0	9.5
CR-2/3A	Spiral	3	1,300	5	250	3,000	17.0	33.5	17.0

** Nominal Capacity shown above is based on standard drain and cut off voltage down to 2.0V at 20°C

COIN TYPE LITHIUM BATTERIES



FEATURES

- High voltage of 3 volts, about twice that of conventional batteries.
- Extremely small self-discharge for a long service and shelf life.
- A wide operational temperature range.
- Compact and lightweight, with extremely high energy density per unit weight.
- Extremely safe (poly-carbon monofluoride lithium batteries)
- Extremely strong load pulse characteristics

APPLICATIONS

- Electronic watches (digital and analog)
- Calculators
- Cameras
- Electronic translators
- For memory backup in all types of devices (with tab terminals)
- Other compact, low power consuming cordless appliances

(CF)_n/Li BATTERIES: POLY-CARBON MONOFLUORIDE

Model No.	Electrical characteristics(20°C)					Recommended Drain		Dimensions		
	JIS	IEC	Nominal Voltage (V)	*Nominal Capacity (mAh)	Pulse (mA)	Standard (mA)	Low (μA)	Diameter (mm)	Height (mm)	Weight (g)
BR1216	—	—	3	25	5	0.03	1	12.5	1.60	0.6
BR1220	—	—	3	35	5	0.03	1	12.5	2.00	0.7
BR1225	—	—	3	38	5	0.03	1	12.5	2.50	0.9
BR1616	—	—	3	48	8	0.03	1	16.0	1.60	1.0
BR2016	—	—	3	75	10	0.03	1	20.0	1.60	1.5
BR2020	—	—	3	100	10	0.03	2	20.0	2.00	2.0
BR2032	—	—	3	190	10	0.03	4	20.0	3.20	2.5
BR2320	—	—	3	110	10	0.03	2	23.0	2.00	2.5
BR2325	—	—	3	165	10	0.03	3	23.0	2.50	3.0
BR2330	—	—	3	255	10	0.03	5	23.0	3.00	3.2
BR3032	—	—	3	500	10	0.03	10	30.0	3.20	5.5

* Nominal capacity shown is based on standard drain.

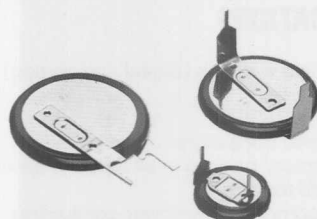
MnO₂/Li BATTERIES: MANGANESE DIOXIDE

Model No.	Electrical characteristics(20°C)					Recommended Drain		Dimensions		
	JIS	IEC	Nominal Voltage (V)	*Nominal Capacity (mAh)	Pulse (mA)	Standard (mA)	Low (μA)	Diameter (mm)	Height (mm)	Weight (g)
CR1025	CR1025	—	3	32	5	0.10	1	10.0	2.50	0.7
CR1216	CR1216	—	3	25	5	0.10	1	12.5	1.60	0.7
CR1220	CR1220	CR1220	3	35	5	0.10	1	12.5	2.00	0.9
CR1616	CR1616	—	3	50	8	0.10	1	16.0	1.60	1.2
CR1620	—	CR1620	3	70	8	0.10	1	16.0	2.00	1.3
CR1632	—	—	3	110	8	0.10	1	16.0	3.20	1.8
CR2012	CR2012	—	3	55	10	0.10	1	20.0	1.20	1.4
CR2016	CR2016	CR2016	3	70	10	0.10	2	20.0	1.60	1.7
CR2025	CR2025	CR2025	3	150	15	0.20	3	20.0	2.50	2.5
CR2032	CR2032	CR2032	3	210	15	0.20	4	20.0	3.20	3.3
CR2320	CR2320	—	3	125	15	0.20	3	23.0	2.00	3.0
CR2330	CR2330	—	3	250	15	0.20	5	23.0	3.00	4.0
CR2354	—	—	3	560	15	0.20	5	23.0	5.40	5.9
CR3032	—	—	3	500	15	0.20	10	30.0	3.20	7.1
CR2477	—	—	3	1000	10	0.20	10	24.5	7.70	10.5

* Nominal capacity shown is based on standard drain.

Note: Cells are available in assorted pin and tab configurations.
Consult your local regional office for additional information.

VANADIUM PENTOXIDE



FEATURES

- One high-voltage battery can serve your backup needs. Does work of three 1.2V Ni-Cd or two capacitors.
- Months of continuous use as a backup.
- Self discharge rate less than 2%/yr.
- Superior reliability; withstands overcharging and discharging.

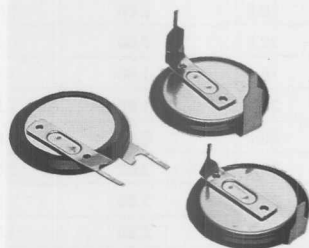
APPLICATIONS

- Memory backup
Facsimiles, ECRs, Telephones, Typewriters, Sequencers, VTRs, Video cameras, Personal computers, Memory cards, Tuners.

Model No.	Nominal voltage (V)	Nominal Capacity (mah)	Dimensions (mm)		Basic Battery weight (g)	Recommended drain (uA)
			External diameter	Height		
VL1220	3.0	7	12.5	2.0	0.8	<20
VL2020	3.0	20	20.0	2.0	2.2	<70
VL2320	3.0	30	23.0	2.0	2.8	<100
VL2330	3.0	50	23.0	3.0	4.0	<100
VL3032	3.0	100	30.0	3.2	6.3	<200

Charge/dicharge cycle	About 1000 times with a 10% discharge depth
Charge	20 to 30h to fully charge at a fixed voltage of 3.4 + 0.15V
Operating temperature	-20°C(-4°F) - 60°C(140°F)

CARBON LITHIUM



FEATURES

- Capability for back-up of high-voltage (3V) power supply lines.
- Capable of 2,000 cycle use at nominal capacity discharge.
- Can be charged with small current (as low as several A).
- Combining with solar batteries can open up a whole new range of applications.
- Can be used within a wide temperature range of -20°C to +60°C (-4°F to +140°F).

APPLICATIONS

- Main power source for solar battery clocks, calculators, toys, display devices, communications equipment, others.
- Backup or auxiliary power source for electronic equipment, memory devices.

Model No.	Electrical characteristics			Dimensions		Weight (g)	Charging Method
	Nominal Voltage (V)	Nominal Capacity (mAh/3 to 2V)*	Recommended Drain (uA)	Diameter mm(inch)	Height mm(inch)		
CL1220	3	0.3	1~30	12.5(0.49)	2.0(0.08)	0.8	Voltage control method
CL2020	3	1.0	1~100	20.0(0.79)	2.0(0.08)	1.9	
CL2320	3	1.5	1~200	23.0(0.91)	2.0(0.08)	2.8	
CL2330	3	2.5	1~200	23.0(0.91)	3.0(0.12)	3.7	

*0.1mAh/3 to 2V=3.6Farad.



FEATURES

- Consumer replaceable (Recognized by UL)
- High safety and reliability
- Rapid discharge for strobes is possible at 6V
- Superior shelf life with minimal self-discharge
- High current pulse discharge is possible
- Application is possible over a wide temperature range
- Light weight
- High energy density

Model	CR123A	2CR5M	CR-P2	BR-P2
Nominal Voltage (V)	3	6	6	6
Nominal capacity (mAh)	1,300	1,300	1,300	1,200
Dimensions (mm)	17.1x34.5	17x34x45	19.5x34x36	19.5x34x36
Weight (g)	17	37	37	31

COPPER OXIDE LITHIUM BATTERY



FEATURES

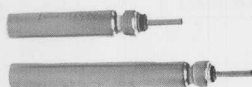
- Compatible with 1.55V silver oxide batteries
- Large electric capacity per unit volume
- Superb storability with minimized self-consumption
- Operable in a wide range of temperatures
- Highly resistant to leakage

APPLICATIONS

- Electronic watches (analog)
- Electronic calculators
- Electronic clinical thermometers
- Various compact low power cordless equipment

Model No.	Electrical Characteristics					Dimensions		Weight (g)
	Nominal Voltage (V)	Nominal Capacity (mAh)	Recommended Drain			Diameter mm	Height mm	
			High (mA)	Standard (mA)	Low (μA)			
GR 927	1.55	60	0.3	0.04	0.7	9.5	2.7	0.6

PIN TYPE LITHIUM BATTERIES



FEATURES

- Compact and lightweight
- Twice the voltage of conventional dry batteries
- Excellent temperature characteristics
- Pin terminal for easy connection

APPLICATIONS

- LED illumination
- LED night fishing floats
- Fishing pole tip lights
- Other types of illumination
- Microphones
- Toys

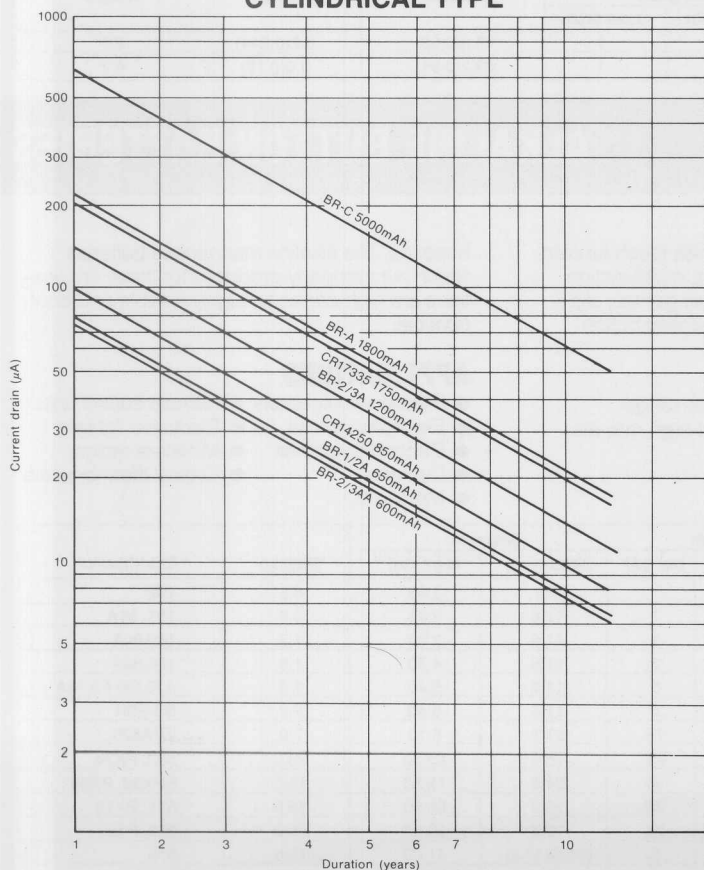
Model No.	Electrical Characteristics				Dimensions		Weight (g)	Operating Temperature Range
	Nominal Voltage (V)	Nominal Capacity (mAh)	Recommended Drain		Diameter mm	Height mm		
			Pulse (mA)	Standard (mA)				
BR425	3	25	4	0.5	4.2	25.9	0.6	-20°C~±60°C(-4°F~140°F)
BR435	3	50	6	1	4.2	35.9	0.9	-20°C~±60°C(-4°F~140°F)

LITHIUM BATTERY SELECTOR CHARTS

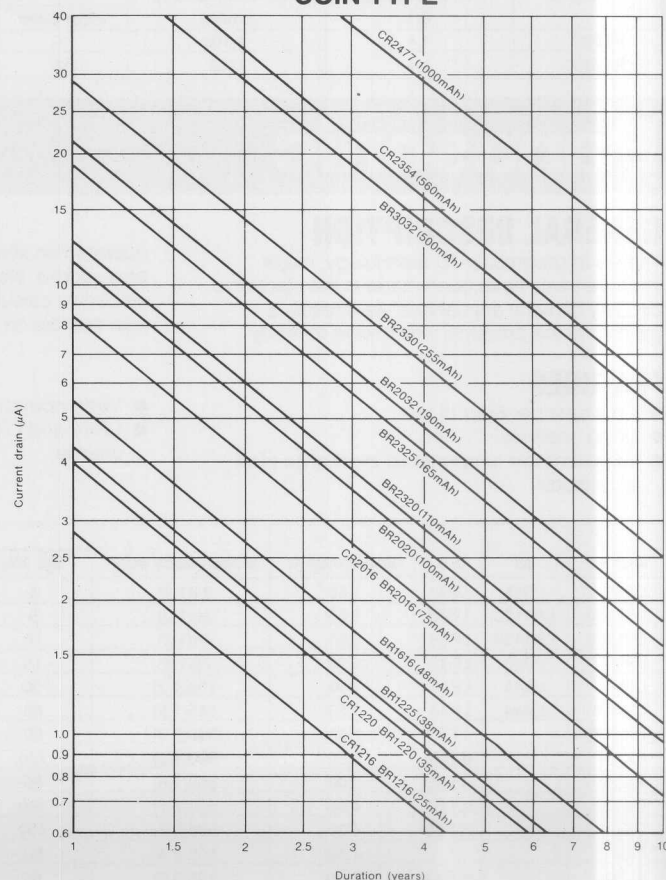
Formula

$$\text{Duration (years)} = \frac{\text{Nominal Capacity (mAh)}}{\text{Current drain (mA)} \times 24 \text{ (hours)} \times 365 \text{ (days)}}$$

CYLINDRICAL TYPE



COIN TYPE



ZINC-AIR BATTERIES (BUTTON-TYPE) GENERAL DESCRIPTION

Up to now mercury batteries have been the type chiefly used for hearing aids. But given the concern of producing a button-type Zinc-Air battery as a new type to take the place of the mercury battery, Panasonic has acquired considerable

technical expertise in making micro batteries leakproof. The superbly reliable button-type Zinc-Air battery is a combination of these technologies. It efficiently converts oxygen in the air into battery energy and offers advanced

features such as excellent storage and leakproof qualities.

Zinc-Air batteries are approximately 40% lighter but have twice the capacity of mercury batteries, and are the ideal battery for hearing aids.



FEATURES

- Small size, large capacity
- Quick start-up, stable voltage
- Light weight

APPLICATIONS

- Hearing aids
- Pagers
- Medical equipment, Electrocardiogram transmitters, etc.

Model No.	IEC	Electric characteristics (20°C)					Dimensions (mm)(inch)		Weight	Cross reference by model size
		Nominal voltage (V)	Nominal capacity (mAh)	Recommended drain (mA)			Diameter	Height		
				High drain	Standard drain	Low drain				
PZ675P	PR44	1.4	540	8.0	2.0	0.5	11.6(0.457)	5.4(0.213)	1.7	675
PZ13P	PR48	1.4	230	3.0	0.85	0.2	7.9 (0.311)	5.4(0.213)	0.8	13
PZ312P	PR41	1.4	110	3.0	0.85	0.2	7.9 (0.311)	3.6(0.142)	0.5	312
PZ230	(PR530)	1.4	50	1.0	0.43	0.2	5.8(0.228)	3.6(0.142)	0.3	230,10

ZINC-AIR BATTERIES FOR PAGERS GENERAL DESCRIPTION

Zinc-Air batteries, which generate electricity by making use of the oxygen in the air, are chiefly used as power sources for hearing aids. There

is also a demand, however, for small, light-weight batteries in the rapidly growing pager market. The PR1662 and PR2330 zinc-Air

batteries for small pagers have now been developed in response to this demand.



FEATURES

- The world's highest energy density
- The world's largest electric capacity
- The world's first coin-type Zinc-Air battery (PR2330)
- Excellent Shelf Life

APPLICATIONS

- Pagers
- Medical equipment, Electrocardiogram transmitters, etc.
- Pocket-type hearing aids

Model No.	Electric characteristics (20°C)					Dimensions (mm)(inch)		Weight
	Nominal voltage (V)	Nominal capacity (mAh)	Recommended drain (mA)			Diameter	Height	
			High drain	Standard drain	Low drain			
PZ630	1.4	1,100	16	5	1	16.0(0.63)	6.2(0.244)	3.7
PZ2330	1.4	700	16	5	1	23.2(0.91)	3.0(0.12)	4.1

GENERAL DESCRIPTION

Thanks to progress in IC technology, major improvements have been made in the electronic circuitry of many appliances. As a result, a majority of the products which were formerly

operated on silver oxide batteries (such as cameras, clocks, electronic lighters, multifunction electronic calculators, electronic games, etc.) now operate on alkaline manganese button

batteries. The alkaline manganese batteries which our company produces for these applications are high-capacity, highly reliable and economical.

FEATURES

- Low cost per hour of use
- Long shelf-life
- Excellent low temperature discharge characteristics

- Wide operating temperature range
- LR44 and LR43 capable of high rate discharge

APPLICATIONS

- Electronic calculators
- Electronic games
- Electronic watches
- Cameras
- Melody IC
- Remote control units
- Electronic lighters
- Miniature radios
- Clinical thermometers

Model No.	JIS	I.E.C.	Nominal Voltage (V)	Nominal Capacity (mAh)	Recommended Drain			Dimensions		Weight (g)	Cross Reference
					High (mA)	Standard (mA)	Low (μA)	Diameter (mm)	Height (mm)		
LR41	LR41	LR41	1.50	24(1.2)	5	0.10	1	7.9	3.60	0.6	192
LR1120	LR1120	LR55	1.50	23(1.2)	5	0.10	1	11.6	2.05	0.8	191, 91A
LR1130	LR1130	LR54	1.50	44(1.2)	10	0.10	1	11.6	3.05	1.2	189, 89A
LR43	LR43	LR43	1.50	70(1.2)	15	0.10	3	11.6	4.20	1.6	186, 86A
LR44	LR44	LR44	1.50	105(1.2)	50	0.10	5	11.6	5.40	2.0	A76, SB-F9, 76A
LR44H	LR44	LR44	1.50	145(1.2)	20	0.10	5	11.6	5.40	2.2	SB-F9H
PX-825		LR53	1.50	300(0.9)	50	5.00	15	23.1	6.10	7.0	EPX825
PX-24		2LR50	3.00	580(1.8)	100	10.00	25	16.9	43.50	26.0	532, PX24
PX-30		2LR53	3.00	300(1.8)	50	5.00	15	24.0	12.50	15.0	EPX30, PX30
PX19		3LR50	4.50	580(2.7)	100	10.00	25	16.9	60.00	35.0	531, PX19
PX-21		3LR50	4.50	580(2.7)	100	10.00	25	16.9	50.50	35.0	523, PX21
7K31			4.50	105(2.4)	50	5.00	5	(11.5x17.2)	41.00	13.5	538
4LR44		4LR44	6.00	105(3.0)	50	3.00	5	13.0	25.10	10.0	A544

Note: Nominal capacity shown above is based on the standard when the battery is used until the end of the voltage indicated in parenthesis.

FEATURES

- High current and large capacity for excellent performance
- Stable Voltage and current
- Excellent storage life
- Unsurpassed resistance to leakage
- 99.999% Mercury free



APPLICATIONS

- Headphone stereo, radio-cassette recorders, strobes, cameras, electronic calculators, 8mm cameras, electric shavers, tape recorders, high-power flashlights, toys and other cordless products

Model Number	V	Diameter (in.)	Height (in.)	Av.Wt. (gms)
*AM1 (Size "D")	1.5	1.346	2.421	135
*AM2 (Size "C")	1.5	1.031	1.969	65
*AM3 (Size "AA")	1.5	.571	1.988	24
AM4 (Size "AAA")	1.5	.413	1.752	12
AM5 (Size "N")	1.5	.742	1.189	9

Model Number	V	L(m)	W(m)	D(m)	Wt.(gms)
*6AM6 (9V)	9	1.929	1.043	0.689	47

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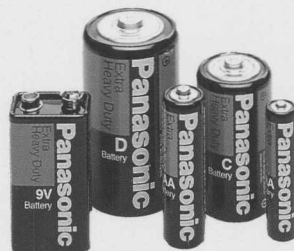
CARBON ZINC BATTERIES

APPLICATIONS

- Transistor radios, tape recorders, portable TVs, interphones, trancivers, electronic calculators, clocks and watches, communications equipment, measuring instruments and various other electronic products
- Flashlights, penlights and various other lighting devices
- 8mm cameras, camera flashes and strobes and other photographic products
- Gas and oil equipment, toys, etc.

EXTRA HEAVY-DUTY BATTERIES

- Unsurpassed leakage resistance for a longer service life
- Discharge characteristics suited for all applications
- Excellent storage life



Model Number	V	Diameter (in.)	Height (in.)	Av.Wt. (gms)
UM-1N (Size "D")	1.5	1.339	2.421	100.00
UM-2N (Size "C")	1.5	1.031	1.969	51.50
UM-3N (Size "AA")	1.5	.571	1.988	19.00
UM-4N (Size "AAA")	1.5	.413	1.752	9.70
UM-5N (Size "N")	1.5	.472	1.189	6.55

Model Number	V	L(m)	W(m)	D(m)	Wt.(gms)
006PN (9V)	9	1.909	1.043	0.689	38

HEAVY-DUTY BATTERIES

- Unsurpassed leakage resistance for a longer service life
- Discharge characteristics suited for all applications
- Excellent storage life



Model Number	V	Diameter (in.)	Height (in.)	Av.Wt. (gms)
UM-1D (Size "D")	1.5	1.339	2.421	98
UM-2D (Size "C")	1.5	1.031	1.969	48
UM-3D (Size "AA")	1.5	.571	1.988	18

Model Number	V	L(m)	W(m)	D(m)	Wt.(gms)
006PD (9V)	9	1.909	1.043	0.689	38

GENERAL PURPOSE BATTERIES

- Our Least Expensive Cylindrical Battery Line. This general-purpose battery offers maximum cost performance in low-drain, intermittent applications.



Model Number	V	Diameter (in.)	Height (in.)	Av.Wt. (gms)
UM-1 (Size "D")	1.5	1.339	2.421	88
UM-2 (Size "C")	1.5	1.031	1.989	44
UM-3 (Size "AA")	1.5	.571	1.988	15

Model Number	V	L(m)	W(m)	D(m)	Wt.(gms)
006P(9V)	9	1.909	1.043	0.689	37

Rechargeable Sealed Lead-Acid

Primary Lithium

Rechargeable Nickel Cadmium

Carbon Lithium Rechargeable Coin Type

Cylindrical Alkaline

Carbon Zinc

Mercury

Mercury Stack

Alkaline Button

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